

REMARKS

The Office Action dated September 22, 2003 has been fully considered. Claims 1-14 are pending in this application. Claim 15 has been added.

Applicant appreciates Examiner's indication of allowability of claim 2 at paragraph 5 on page 3.

In paragraph 2 on page 2 of the Office Action, claims 1, 12 and 13 were objected to due to certain informalities.

Applicant respectfully traverses the objection. However, in accordance with Examiner's suggestion, Applicant has amended claims 1, 12 and 13 to further clarify informalities in the application. The amendments described do not narrow or limit the scope of the claims.

In paragraph 4 on page 2 of the Office Action, claims 1 and 3-14 were rejected under 35 U.S.C. § 103(a) over Takuji (Japanese Patent No.: JP 10-256621) in view of the Journal of Applied Physics article "Oxygen as a Surfactant in the Growth of Giant Magnetoresistive Spin Valves" by Egelhoff et al.

Applicant respectfully traverses the Section 103(a) rejection. To establish a *prima facie* case for rejection under 35 U.S.C. § 103(a), all the claim limitations must be taught or suggested by the prior art and there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. *See MPEP §§ 2143.01 and 2143.03*. In this instance, neither of the requirements is present and a *prima facie* rejection fails under 35 U.S.C. § 103(a).

Applicant's invention is directed towards "providing precise control of magnetic coupling fields in NiMn top spin valve heads and amplitude enhancement" (page 34, lines 1-2) For example, as recited in the independent claims the present application requires "forming at least one copper layer in a NiMn top spin valve; oxidizing the at least one copper layer in the NiMn top spin valve; and depositing remaining layers of the NiMn top spin valve head."

The Takuji reference, on the other hand, is directed towards magnetoresistance effect material where the object is to obtain a new construction of a spin-valve type having a magnetic field inversion layer of a low coercive force by using a base layer composed by

laminating a Zr layer and a Cu layer in this order. The Takuji teaching, however, does not teach, disclose or suggest "oxidizing the at least one copper layer in a NiMn top spin valve" from the instant application.

The Egelhoff article is directed towards using oxygen as a surfactant in the growth of giant magnetoresistance spin valves. Egelhoff, however, also fails to teach, disclose or suggest "forming at least one copper layer in a NiMn top spin valve" and "oxidizing the at least one copper layer in the NiMn top spin valve."

Applicant's application identifies the problem of inter-diffusion of spin valve head layers due to heating a NiMn spin valve sensor to temperatures greater than 225°-240° C. for more than 2-3 hours (*see* page 5, lines 8-11); and addresses the problem by developing a method for "precise control of magnetic coupling field in NiMn top spin valve heads and amplitude enhancement" using oxidized copper layers (page 7, lines 11-13).

Takuji does not recognize the problem of inter-diffusion of spin valve head layers due to heating NiMn spin valves. Takuji merely addresses a new construction of a spin valve type magnetoresistance effect material and includes NiMn as one of the available layers to be used in constructing spin valves.

Egelhoff clearly also fails to recognize the above-mentioned problem because Egelhoff does not even identify NiMn as a material used in fabricating spin valves, nor does Egelhoff recognize the problem with bulk and interfacial magnetostriction posed by the annealing process when a NiMn layer is used.

The Applicant in the instant application recognized the problem of magnetostriction in NiMn GMR heads and the role magnetostriction plays in "influencing the output sensitivity of the head, the stability and the optimum bias point" (page 21, lines 7-9); and identifies oxidization of copper seed and spacer layers on the spin valve head as a solution to reducing megntostriction changes of the free layer (*see* page 22 lines 1-7) in NiMn heads. Takuji and Egelhoff do not even suggest forming at least one copper layer in a NiMn top spin valve and oxidizing the at least one copper layer in the NiMn top spin valve to solve the problems associated with magnetostriction on top NiMn spin valve heads.

Furthermore, Egelhoff does not teach, disclose or suggest "depositing remaining layers of the NiMn top spin valve head after forming at least one copper layer in a NiMn top spin valve and oxidizing the at least one copper layer in the NiMn top spin valve.

Furthermore, there is no motivation to combine the cited references to yield the results of the instant application because neither of the above-mentioned problems is identified in Takuji or Egelhoff and thus nothing leads one skilled in the art to combine the teachings of Takuji and Egelhoff to find possible solutions for remedying the above-identified problems (*see* M.P.E.P. § 2143.01).

For the above-stated reasons and for the reason that follows, new claim 15 is patentable over the cited prior art. Claim 15 requires "oxidizing the at least one copper layer in the NiMn top spin valve to provide a negative coupling field without affecting GMR effect or resistance." Neither Takuji or Egelhoff teaches, discloses or suggests "oxidizing the at least one copper layer in the NiMn top spin valve that provides a negative coupling field without affecting GMR effect or resistance." Therefore, claim 15 is in condition for immediate allowance.

Dependent claims 2-14 are also patentable over the reference because they incorporate all of the limitations of the corresponding independent claim. Further, dependent claims 2-14 recite additional novel elements and limitations. Applicant reserves the right to argue independently the patentability of these additional novel aspects. Therefore, Applicant respectfully submits that dependent claims 2-14 are patentable over the cited patent.

On the basis of the above amendments and remarks, it is respectfully submitted that the claims are in immediate condition for allowance. Accordingly, reconsideration of this application and its allowance are requested.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Attorney for Applicants, David W. Lynch, at 651-686-6633 Ext. 116.

Respectfully submitted,

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